

## ABSTRACT

A two-dimensional photonic crystal surface-emitting laser having a photonic crystal (20) in which a photonic crystal periodic structure (21) is located in or near an active layer (first medium) (12) which emits light when carriers are injected thereto. The photonic crystal periodic structure (21) comprises a second medium with a refractive index different from that of the active layer scattered in two-dimensional periodic array. The photonic crystal periodic structure is of a square lattice structure or a triangular lattice structure which has translation symmetry but does not have rotation symmetry. Alternatively, the photonic crystal periodic structure is of a square lattice structure or a rectangular lattice structure which is classified into  $pl$ ,  $pm$ ,  $pg$  or  $cm$  according to the two-dimensional pattern classification method. It is the most desirable that the lattice structure is composed of triangular lattice points.